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Meningococcal Disease in Child Leads to Mass Prophylaxis in Day Care

On Sunday, February 8, 2004 the Section of Epidemiology was notified of a possible case of meningococcal meningitis in a 4-year-old Mat-Su resident.

Investigation

The patient was well until Saturday noon when he told his mother that he had a headache and lay down to sleep. He was lethargic for the rest of the day, waking only to vomit. When his mother checked on him at 2 am, she was unable to rouse him and called 911. EMTs found him unresponsive and transported him to Valley Hospital. Upon arrival the patient was unresponsive with nuchal rigidity, T=101.4º rectal, pulse 97, respirations 24, and BP 96/64. WBC was 24.9 (87% granulocytes, 3% lymphocytes, 10% monocytes), prothrombin time 15.4 (normal=9.9-12.3 seconds). Blood cultures were drawn prior to starting IV Rocephin. The child was intubated and transferred to Providence Pediatric ICU. The child developed a full body, pinpoint, red rash. CSF drawn on 2/9 after 24 hours of antibiotic therapy was moderately cloudy, WBC 1530/mm3 (81% polys, 7% lymphs, 12 % monos), RBC 120/mm3, glucose 76, protein 106, meningitis panel negative. With continued antibiotic therapy, the child recovered.

The child spent time in two households totaling 14 members and attended a daycare (DCC) with approximately 65 other children and 13 staff. The last day of DCC attendance for the child was 1/28. Because of the clinical picture, all 14 family members and 75 (97%) DCC attendees and staff were given prophylaxis on 2/8 and 2/9 respectively. Medication was handed to parents at the DCC along with an information sheet.

On 2/11, blood cultures at Valley Hospital grew *Neisseria meningitidis*, the causative organism for meningococcal meningitis. The isolate was typed as serogroup B at the State Public Health Laboratory-Anchorage.

Discussion

Invasive meningococcal disease is a public health emergency. Case-fatality rates formerly exceeded 50%; however current therapies have reduced the case-fatality rate to 5-15% if diagnosed early (20-40% for fulminant meningococcemia). Family members and other close contacts such as DCC attendees are at increased risk for developing the disease after exposure. It is imperative that all close contacts be found and offered prophylaxis as soon as possible. Decisions to treat contacts must often been made on clinical grounds. In this case, the clinical diagnosis was confirmed three days later by laboratory culture of blood specimens.

N. meningitidis, a Gram-negative diplococcus, may be recovered from blood or CSF. Gram-stained smears from petechiae or the buffy coat of spun blood may reveal organisms. Blood cultures should be obtained prior to the start of antibiotic therapy but only if this does not delay initiation of treatment. Treatment for the patient is penicillin G IV (250,000 U/kg per day, max 12 million U/day, divided every 4-6 hrs), for 5-7 days. Cefotaxime, ceftriaxone, and ampicillin are acceptable alternatives. Chloramphenicol may be used in patients with penicillin allergy. Patients with meningococcal disease should be given rifampin prior to discharge from the hospital if neither a third generation cephalosporin nor ciprofloxacin was given as treatment to ensure elimination of the organism.

Transmission is by direct contact, including respiratory droplets from the nose and throat of the infected person. Fomite transmission is insignificant. Infection usually causes only a subclinical mucosal infection. In non-epidemic periods, approximately 10% of the population may be colonized. Invasion leading to systemic disease is rare. A high ratio of carriers to cases prevails. Outbreaks occur in large congregations of people, such as military barracks and college dorms; many cases are sporadic. The currently available meningococcal vaccine does not cover the most common serogroup (B) of sporadic cases in the 1990s.

Adult contacts may be treated with rifampin, ciprofloxacin or ceftriaxone. Children contacts may be treated with either rifampin or cefrtriaxone (Table 1). Pregnant women should not receive antibiotics, but should watch for fever, rash, nausea, vomiting, or stiff neck and call their health care provider if symptoms appear.

Recommendations

1. Health care providers should maintain a high index of suspicion for meningococcal disease. Suspected or confirmed meningococcal disease is a public health emergency and should be reported immediately to the Section of Epidemiology at 269-8000, or 1-800-478-0084 after hours.
2. Cultures of blood and CSF may confirm the diagnosis and should be obtained if possible. Gram-stain of a scraping of the rash or a sample of the buffy coat from spun blood may reveal Gram-negative diplococci, helping to rapidly support the diagnosis.
3. Antibiotic treatment as described above should be started immediately on all suspected or confirmed cases.
4. Close contacts, including household members and DCC attendees should be identified as quickly as possible and treated. Direct distribution of the medication in DCCs improves compliance and should be conducted.
5. Prophylaxis for hospital staff should be limited to those who give mouth-to-mouth resuscitation or manipulate intubation tubes.
6. All meningococcal isolates should be sub-cultured and sent to the State Public health Laboratory-Anchorage for serogroup identification. The referring lab should always maintain the initial culture. There is no charge for this reference service.

Table 1. Schedule for administering chemoprophylaxis for meningococcal disease

Drug	Age group	Dosage	Duration and route of administration
Rifampin*	Children aged <1 month	5 mg/kg every 12 hrs	2 days, orally
	Children aged <1 month	10 mg/kg every 12 hrs	2 days, orally
	Adults	600 mg every 12 hrs	2 days, orally
Ciprofloxacin†	Adults	500 mg	Single dose, orally
Ceftriaxone	Children aged <15 years	125 mg	Single dose IM§
Ceftriaxone	Adults	250 mg	Single dose, IM§

*Rifampin is not recommended for pregnant women because the drug is teratogenic in laboratory animals. Because the reliability of oral contraceptives may be affected by rifampin therapy, alternative contraceptive measures should be considered while rifampin is being administered.

†Ciprofloxacin is not generally recommended for persons <18 years of age or for pregnant and lactating women because the drug causes cartilage damage in immature laboratory animals. However, ciprofloxacin can be used for chemoprophylaxis of children when no acceptable alternative therapy is available.

§Intramuscular

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(Reported by B.J. Coopes, MD, Anchorage. Contributed by Sue Anne Jenkerson, RNC, MSN, FNP and Gail Bernth, MS, ANP. Thanks to Charleen Pitta, PHN III, Mat-SU Public Health Nursing for her help with this investigation; Sharon Hamrick, Pharmacist and Robin Laird, Pharmacy Technician, for their medication preparation; and the daycare staff and parents for their patience and cooperation.)